

New Claims

1. A means for measuring the relative positions or movements of two objects, comprising
 - a force and/or moment sensor with a first sensor subunit (12) which is connected with a first one of the objects, as well as a second sensor subunit (14) which is coupled to the first sensor subunit (12) relative to same in a springy fashion by means of a first spring arrangement (18), in the following referred to as measuring spring arrangement, with the two sensor subunits (12, 14) each carrying part of measuring components (30, 32, 40) for measuring of relative positions or movements of the two sensor subunits (12, 14) and
 - a second spring arrangement (20), in the following referred to as conversion spring arrangement, which is coupled to the second (16) of the objects relative to same in a springy fashion,
- 15 characterised in that the conversion spring arrangement (20) alone is coupled to the second sensor subunit (14) and the second object.
2. The means according to Claim 1, characterised in that the second object (16) forms an annular body in whose annular interior the force and/or moment sensor is arranged at a distance from the annular body.
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3. The means according to Claim 2, characterised in that conversion spring arrangement (20) is formed by several conversion spring elements evenly distributed arranged in the direction of the annulus circumference, acting in parallel with each other.
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4. The means according to Claim 3, characterised in that the conversion spring elements are formed as helical springs.
5. The means according to Claim 4, characterised in that the helical conversion springs are installed so as to be biased.
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6. The means according to Claim 4 or 5, characterised in that the helical conversion springs extend radially with respect to an annulus axis of the annular body (16).

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7. The means according to one of Claims 3 to 6, characterised in that the conversion spring arrangement (20) comprises a total of three conversion spring elements.
8. The means according to one of Claims 2 to 7, characterised in that the two sensor subunits (12, 14) each comprise a carrier disk for mounting at least parts of the measuring components, and that the two carrier disks are arranged axially spaced one above the other with respect to the annulus axis of the annular body (16) and coupled to each other by the measuring spring arrangement (18).
9. The means according to Claim 8, characterised in that the measuring components (30, 32, 40) of the force and/or moment sensor form six optoelectronic measuring cells for the detection of relative positions or movements of the two objects in six degrees of freedom, with each measuring cell being formed by an arrangement of a light emitting diode (32), a position sensitive detector (30), and a slit diaphragm (40) arranged in the beam path between the diode and the detector, with an axis of the detector being arranged perpendicularly to the slit direction of the slit diaphragm, and with one of the components: diode, detector, and slit diaphragm being arranged at one of the two sensor subunits (12, 14) while the two other ones of these components are arranged at the other sensor subunit.
10. A joystick with a measuring means according to one of Claims 1 to 9.

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